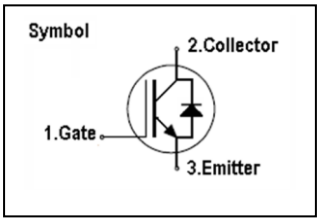
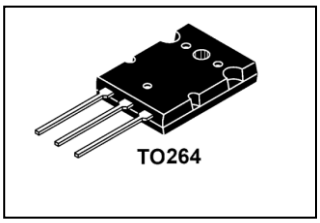
IGBT

Features





- 1200V 75A
- $V_{CE(sat)(typ.)}$=1.95V @V_{GE}=15V,I_C=75A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application such as IH (induction heating),UPS, general inverter and other soft switching applications.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25 ℃)	150	A
	Continuous Collector Current (T_C=100℃)	75	A
I_{CM}	Pulsed Collector Current (Note 1)	225	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	75	A
I_{FM}	Diode Maximum Forward Current (Note 1)	150	A
t_{sc}	Short Circuit Withstand Time（Tj≤150℃）	10	us
P_D	Maximum Power Dissipation (T_C=25 ℃)	520	W
	Maximum Power Dissipation (T_C=100℃)	208	W
T_J	Operating Junction Temperature Range	-55~150	℃
T_{STG}	Storage Temperature Range	-55~150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.24	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.5	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	25	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, V_{GE}= 0V	-	-	100	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 75A	-	1.95	2.65	V
Qg	Total Gate Charge	V_{CC}=600V V_{GE}=15V I_C=75A	-	276		nC
Qge	Gate-Emitter Charge		-	93		nC
Qgc	Gate-Collector Charge		-	165		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=75A R_G=15Ω Inductive Load T_C=25 ℃	-	174	-	ns
t_r	Turn-on Rise Time		-	333	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	308	-	ns
t_f	Turn-off Fall Time		-	106	-	ns
Eon	Turn-on Switching Loss		-	13.4	-	mJ
Eoff	Turn-off Switching Loss		-	4.59	-	mJ
Ets	Total Switching Loss		-	17.99	-	mJ
Cies	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	7352	-	pF
Coes	Output Capacitance		-	334	-	pF
Cres	Reverse Transfer Capacitance		-	45	-	pF

Electrical Characteristics of Diode (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A	-	2.05	2.8	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 600V I_F= 75A Rg=15 Ω	-	1000		ns
I_{rr}	Diode peak Reverse Recovery Current		-	13.7		A
Q_{rr}	Diode Reverse Recovery Charge		-	3906		nC

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Performance Characteristics

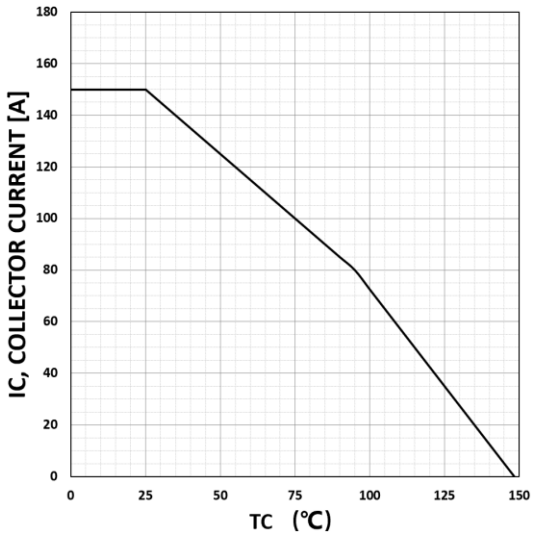


Figure 1. Maximum DC collector current VS. case temperature

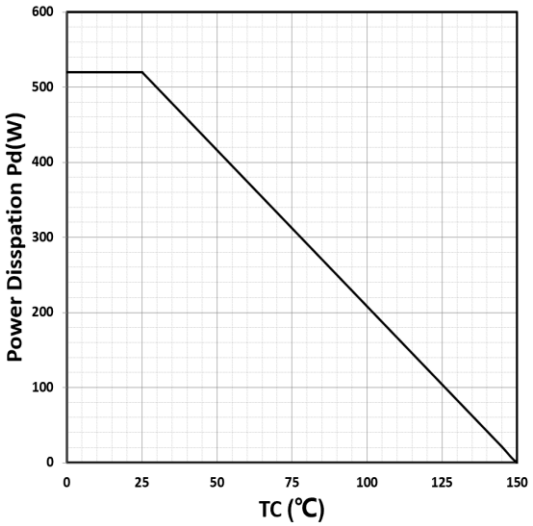


Figure 2. Power dissipation VS. case temperature

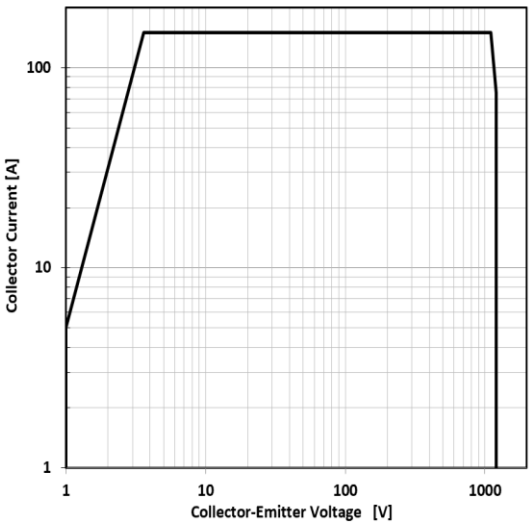


Figure 3. Reverse bias SOA, Tj=125℃,Vge=15V

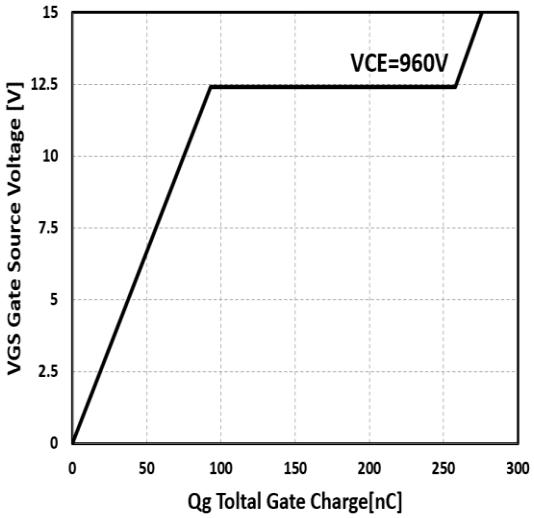


Figure 4. Typical gate charge VS. VGE,IC=75A

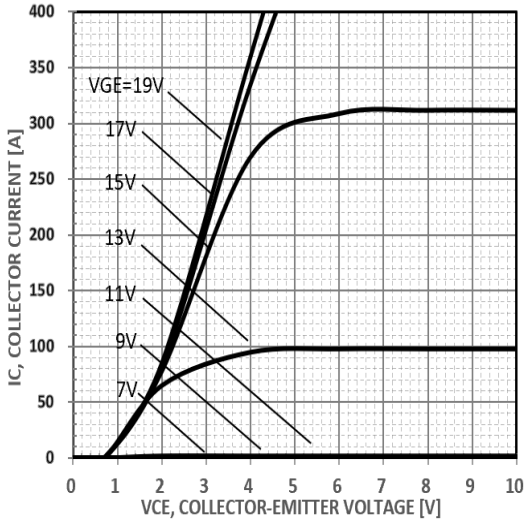


Figure 5. Typical output characteristics

tp=300us Tc=25℃

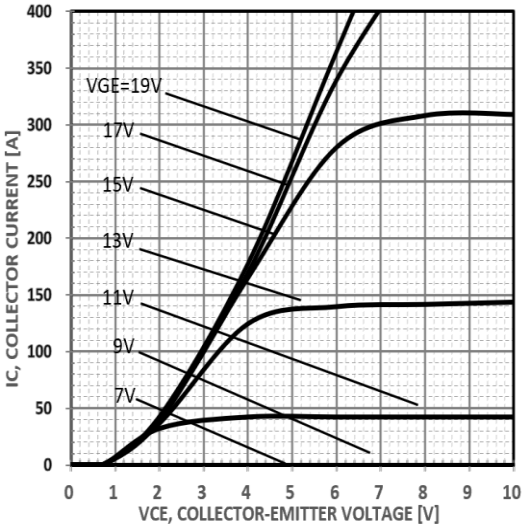


Figure 6. Typical output characteristics

tp=300us Tc=150℃

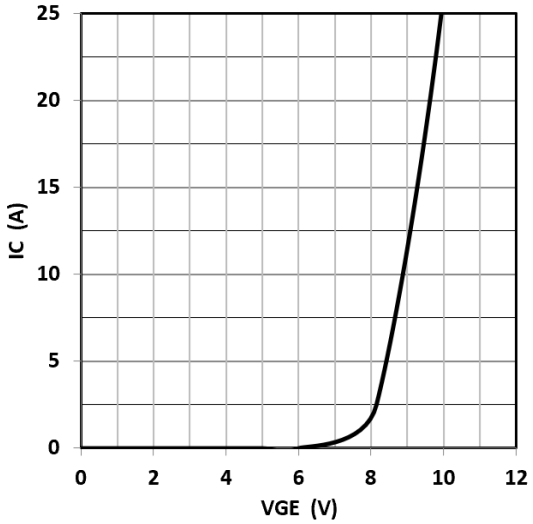


Figure 7. Typical gate threshold voltage

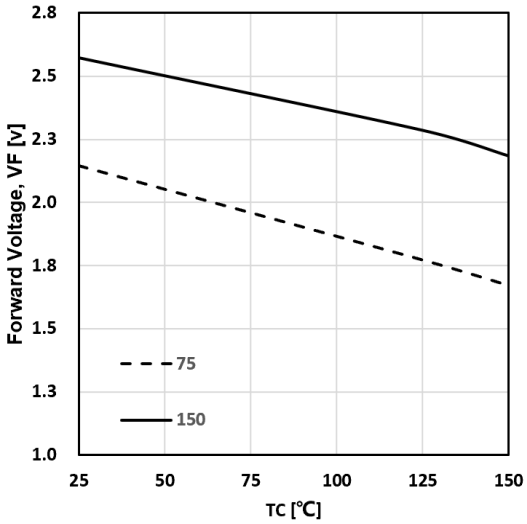


Figure 8. Typical forward voltage vs Tc

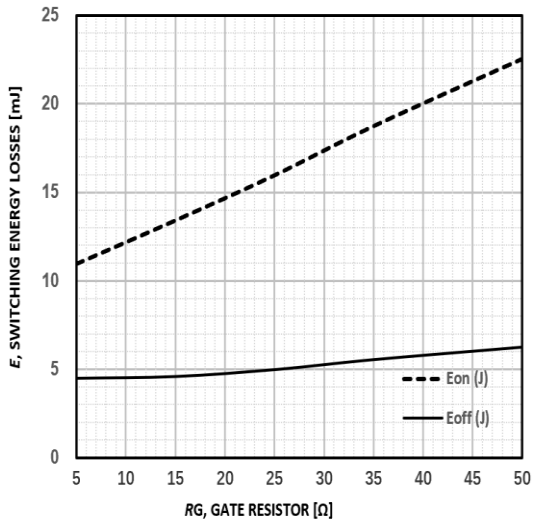


Figure 9. Typical energy loss VS. Rg,TC=25℃,

VCE=600V, VGE=15V ,IC=75A

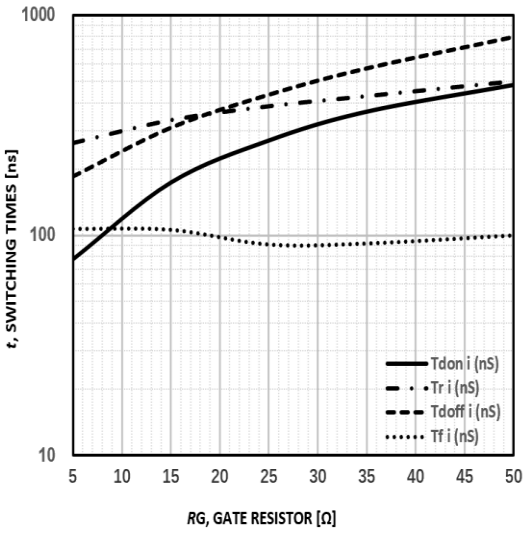


Figure 10. Typical switching time VS. Rg,TC=25℃,

VCE=600V, VGE=15V ,IC=75A

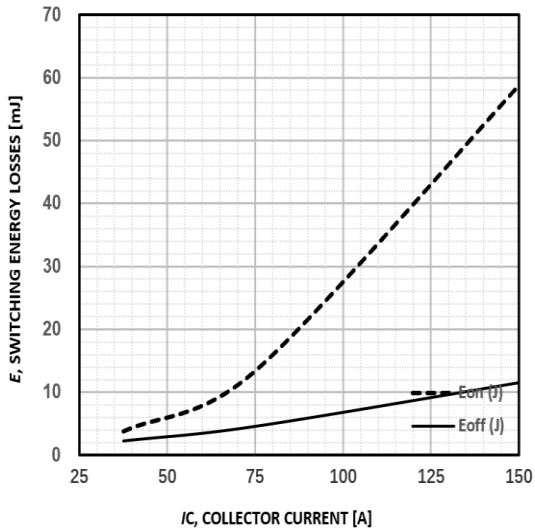


Figure11: Typical energy loss VS. IC, TC=25℃,

VCE=600V, VGE=15V ,RG=15Ω

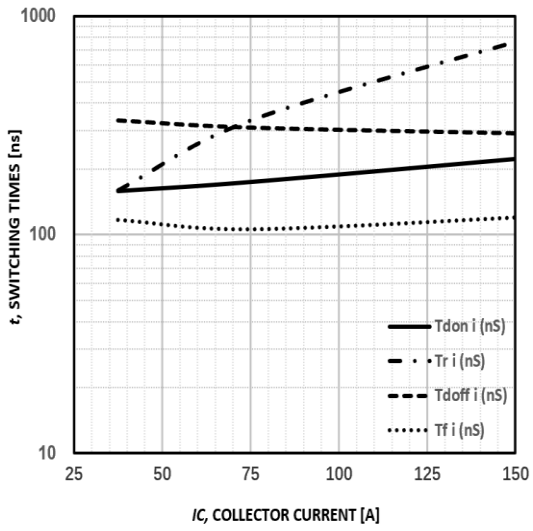


Figure12: Typical switching time VS. IC, TC=25℃,

VCE=600V, VGE=15V,RG=15Ω

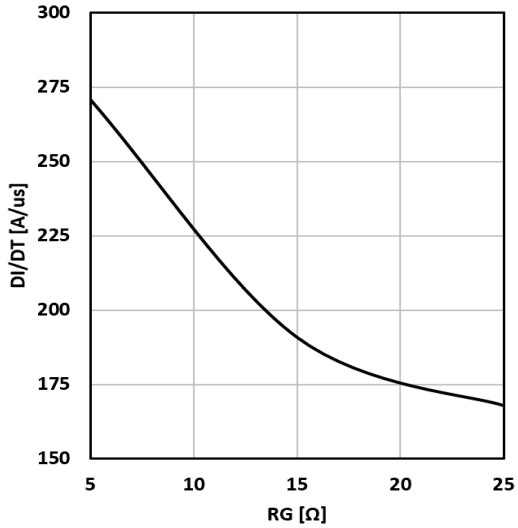


Figure 13. Typical diode di/dt vs rg Tc=25℃
VCE=600V VGE=15V IF=75A

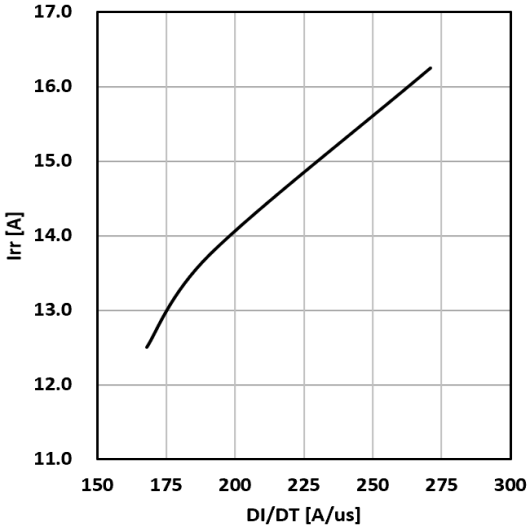


Figure 14. Typical diode irr vs di/dt Tc=25℃
VCE=600V VGE=15V IF=75A

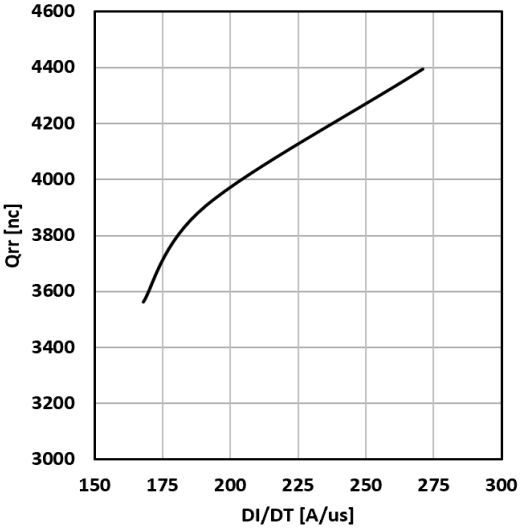


Figure 15. Typical diode Qrr vs di/dt Tc=25℃
VCE=600V VGE=15V IF=75A

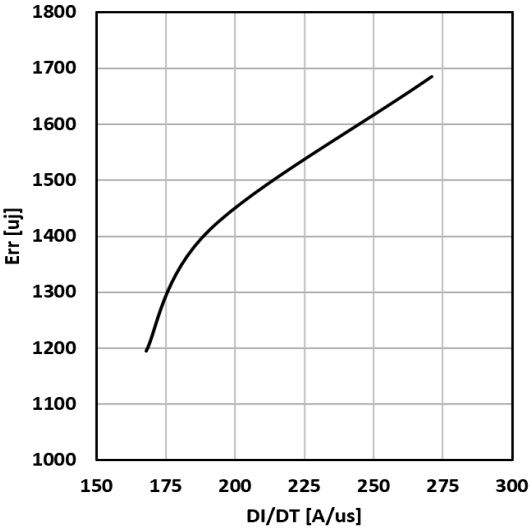


Figure 16. Typical diode Err vs di/dt Tc=25℃
VCE=600V VGE=15V IF=75A

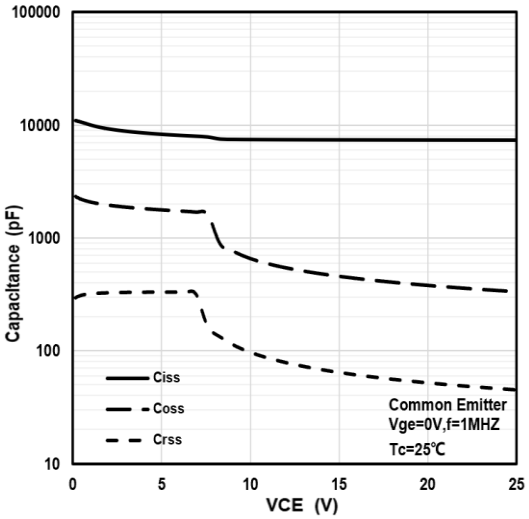


Figure17:Typical capacitance VS. VCE, VGE=0V,f=1MHz

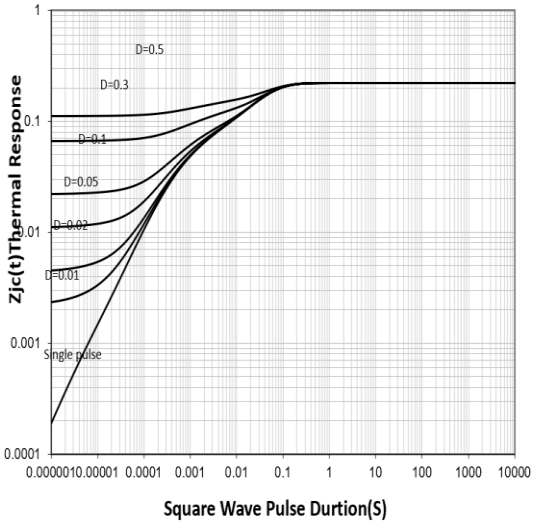
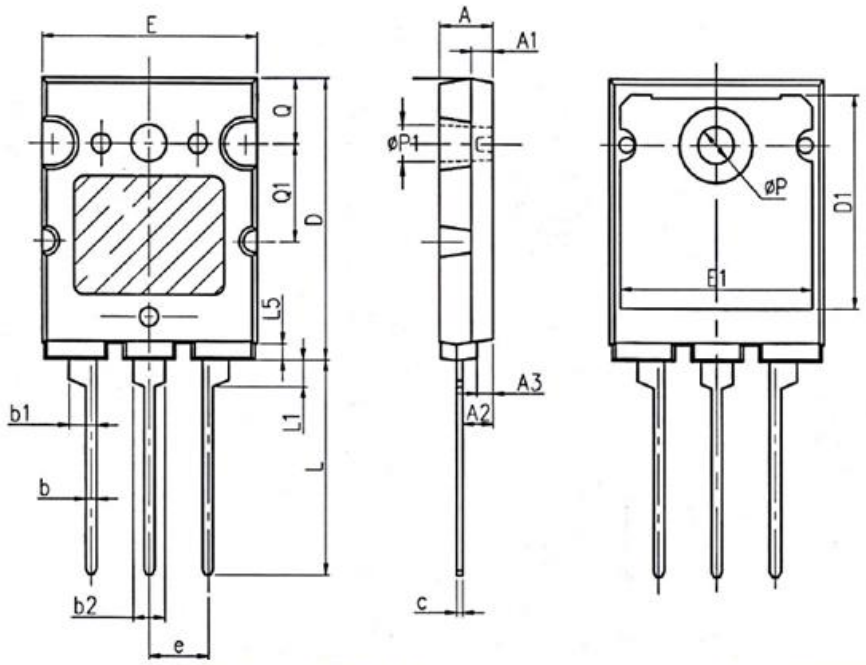


Figure18. normalized transient thermal impedance, junction-to-case

TO264 PACKAGE OUTLINE



SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.80	5.00	5.20	E	19.50	20.00	20.50
A1		2.00 REF		E1	16.00	–	–
A2	2.50	2.80	3.10	e		5.45 TYP	
A3		1.50 REF		L	19.50	20.00	20.50
b	0.90	1.00	1.25	L1	2.30	2.50	2.70
b1	2.30	2.50	2.75	L5		1.35 REF	
b2	2.80	3.00	3.20	ΦP	3.00	3.20	3.40
c	0.50	0.60	0.85	ΦP1	3.20	3.40	3.60
D	25.70	26.00	26.30	Q	5.80	6.00	6.20
D1	19.00	–	–	Q1	8.80	9.00	9.20

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